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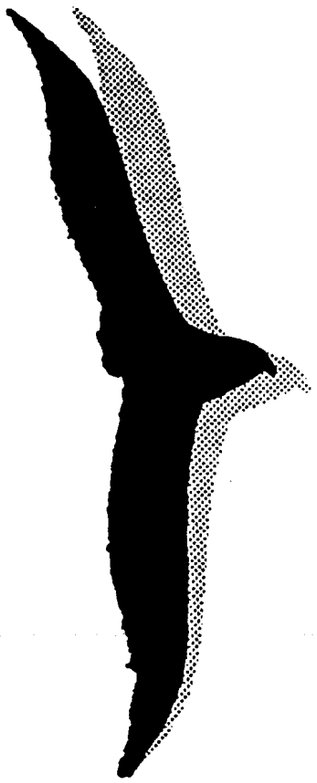

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Displaced Workers in the Net herlands"

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Abstract

This paper studies worker displacement in the Netherlands. We discuss the relevant institutions, and we analyze the incidence and consequences of displacement. In the next stage of the project this paper will be merged with the corresponding paper on the US.

*This paper is the Dutch contribution to the CILN/ Upjohn project on *Losing Work,* Moving On: *International Perspectives on Worker Displacement.*

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1 Introduction

Worker displacement (i.e., job separations initiated by employers because of adverse economic conditions) is an increasingly important phenomenon in the Netherlands. Displacement rates have increased from around 4% in 1970 up to 11% in 1993.[1] This report discusses institutions that are relevant to worker displacement. In addition, we provide an empirical analysis of the incidence of displacement, and the labor market transitions and earnings changes induced by displacement in the Netherlands.

In our analyses of worker displacement we will usually identify displacement with permanent layoffs. We will focus on workers with sufficient tenure, make comparisons with experiences of low-tenure workers, and correct for separations that are worker-initiated. The restriction to *permanent* layoffs is fairly irrelevant in the Netherlands. Temporary layoffs and recall are rarely observed, and the Dutch institutions work against them. For instance, arrangements for Unemployment Insurance (UI) provision to unemployed who are laid off temporarily are restricted to very specific activities.[2] Therefore, we focus on tenure and cause of separation as defining characteristics of displacement.

We use three data sets: the Firm Employment (FE) data set, an administrative longitudinal UI data set (of the Dutch Social Security Council or SVr), and the Labor Force Survey of the OSA (LFS). The FE data set is constructed by sampling individuals from administrative records of firms over the period 1992-1996, and provides information on tenure and separations, reasons of separations, and a variety of individual and job characteristics. The data provide very useful information on the incidence of displacement, and shed some light on labor market transitions immediately following displacement. However, the FE data are silent about subsequent labor market transitions and earnings losses. The UI data set provides information on unemployment spells of all workers entering UI in 1992. As all unemployed workers in the market sector with sufficiently long employment records end up in UI, and as we furthermore observe an indicator of worker-initiated separations in the data, these data can be used to study re-employment durations after displacement, conditional on a positive non-employment spell. As we observe to some extent the entire inflow into UI by sector, municipality and month, we can also construct indicators of excessive inflow into UI, which can be seen as indicators of excessive, or even mass, layoffs. Earnings losses are however not observed in this data set either. For this we require the LFS data, a labor force panel survey covering the period 1985-1990. The LFS data set provides extensive information on labor market transitions and earnings, but suffers from small numbers of displaced workers.

In sum, the data allow for the analysis of the incidence of displacemen and of labor market states occupied just after being displaced, and provide information on re-employment

[1] See Subsection 4.1 for a discussion of displacement rate time series.

[2] It is clear though that temporary layoffs may occur in some less organized way, for instance because UI regulation does not fully prevent seasonally unemployed to enter UI. See Section 2 for institutional details, and Section 4 for further discussion on the consequences for our analysis. Also, Emerson (1988) discusses the role of temporary layoffs in various countries, among which the Netherlands and the US.

durations for those with positive spells of joblessness. Also, the LFS data allow for a rough estimate of earnings losses induced by displacement, and provide some information on labor market states occupied some time after displacement.

Most of the literature on displacement is concerned with wage losses following displacement. In The Netherlands, as in other European countries, displaced workers often flow into unemployment. Unemployment durations are typically so long that one may expect sorting and stigma effects to affect the labor market position of many unemployed displaced workers. As a result, the difference between the pre-displacement wage and the wage earned in the first job after displacement can be affected by factors that are not due to displacement per se (see also Andersen, 1997). This hampers the interpretation of empirical results on this wage difference. An additional empirical problem concerns the fact that the post-displacement wage is unobserved if the unemployment duration is right-censored.

If it is difficult to leave unemployment then employed workers have a relatively strong incentive to prevent exit into unemployment. Workers in the Netherlands who expect displacement therefore have a strong incentive to search actively for another job while still employed. Some job-to-job transitions may therefore be the result of (anticipated) displacement. Indeed, if unemployment durations are long then employment may be a more important destination state following displacement. We return to these issues in the empirical analyses below.

This paper will mainly focus on UI and, to a lesser extent, employment as exit states for displaced workers. Although it could be argued that these cover a significant share of displaced workers in the Netherlands, it is clear that alternative destinations may play a role. In the 1970s and the 1980s, Disability Insurance (DI) allegedly has been used as a convenient alternative to UI in case of separation of workers. Alternatively, early retirement arrangements may have facilitated displacement of older workers. Although both the FE and the LFS data sets provide at least some information on transitions from employment into these alternative destinations, this information is not as rich as the information on unemployment spells. We will discuss institutional arrangements concerning DI and early retirement in detail in Section 2. Also, we use results from existing empirical work for the Netherlands to clarify the role of DI and early retirement beyond the limited information offered by the FE and the LFS data in Section 7.

The plan of this paper is as follows. In Section 2 we discuss institutions which are relevant to displacement in the Netherlands, i.e. employment protection, social security, and wage formation. Section 3 discusses the data sets we use for the analysis of (the consequences of) displacement. Both time series and cross-sectional properties of displacement rates are discussed in Section 4. Section 5 discusses labor market transitions following displacement. Some analyses of earnings changes induced by displacement are presented in Section 6. In Section 7 we discuss the role of early retirement and DI. Section 8 concludes.

2 Institutional setting

This section summarizes Dutch labor market institutions that are relevant to displacement. We first review employment protection, proceed by discussing relevant elements of social security, and finish by outlining wage setting institutions.

2.1 Employment protection

Employment relationships are arranged by either fixed term contracts or permanent contracts. Fixed term contracts allow employers to lay off workers at the end of the contracted period without prior notice or the need of having a permit, and therefore offer no employment protection to the employee. However, if the employee is allowed to continue to work after the contracted period, or if a new (fixed term) contract is written within 31 days of the end date of the first contract, the employee is considered to be working on a 'continued contract', which basically provides the protection of a permanent contract.[3] We will discuss employment protection offered by such contracts next.

As long as workers and firms are bound by a contract, they can only separate after a permit has been granted by a regional employment institution, a rule which is generally applied to firm-initiated separations only. Employers always need a permit for dismissal or layoff of workers, except if there is mutual agreement between the employer and the employee, in case of severe misconduct by the employee (like stealing), in case of bankruptcy of the employer, or if the employment contract is dissolved by court. Permits are usually granted for dismissal because of low performance of the employee, and for layoffs necessary for business economic circumstances (displacement). Dismissal because of illness, marriage, pregnancy and military service is prohibited. Both court cases and permits are frequently used as ways to dissolve labor contracts.

Both employers and employees who want to end their employment relationship are bound by mandatory advance notice requirements. Advance notice periods are always less than 6 months. Exact durations depend on age, tenure and the type of contract involved. In case of separation, advance notice periods start after a permit has been granted, and equal, if not specified otherwise in the contract, as a rule the time between two subsequent wage payments, which is usually 1 month. The employer is also obliged to give advance notice of a number of weeks equal to the years of tenure, up to a maximum of 13 weeks, with 1 additional week per year of tenure for employees of age 45-65, up to a maximum of 26 weeks. Instead, advance notice periods can also be contracted. However, it can never be excluded, nor can it exceed 6 months.

Only if a contract is dissolved by court, and the employee is not declared 'responsible', severance pay can be granted, usually between 1 and 2 monthly salaries per year of tenure.

[3] Note that employers have tried to avoid such 'continued contracts' in several ways, for instance by offering new contracts after slightly more than 31 days, only. Although such contracts are not 'continued contacts' formally, employees have been successful in fighting such contracting behavior in court. Also note that currently laws are prepared that allow for more flexible fixed term contracting, offering less protection to the employee.

2.2 Social security

From the perspective of displacement of longer service workers in the private sector, the most relevant element of Dutch social security is Unemployment Insurance (UI), which is arranged according to the Unemployment Laws of 1949 and 1987 (which have been revised again in the 1990s). We will describe its basic structure in 1992/1993, for which we will use administrative data in this paper. A worker losing his job in the Netherlands is entitled to UI benefits, provided some conditions are fulfilled. The unemployed individual has to face a reduction in his original working hours of at least 5 hours per week, or half of the original working hours if less than 10 hours per week, he should not get paid for this working hour reduction and he should be willing to accept a new job. Furthermore, the unemployed individual should have had a job for at least 26 weeks in the past 52 weeks prior to the start of the unemployment period. Those who fulfil these conditions are entitled to wage-related initial benefits, and in some cases to an extension of these benefits at a level related to the mandatory minimum wage. The initial benefits amount to 70% of the gross wage in the last job before unemployment, and are subject to income tax. The maximum duration of these benefits ranges from 6 months to 5 years, depending on the employment history of the unemployed.[4] The extended benefits are equal to 70% of the gross minimum wage or 70% of the gross wage in the last job before unemployment, whichever is lower, and are again subject to income tax. Unemployed who have had jobs in at least 3 out of the last 5 years are eligible for extended benefits, for a maximum duration of one year, or sometimes longer for older individuals. If, after the expiration of the unemployment insurance benefits, the unemployed individual has not found a job, he may receive subsistence benefits (social assistance), which are means (household income) tested and related to what is considered to be the social minimum income. The Unemployment Law provides some arrangements for 'short time unemployment' due to weather conditions, but no general arrangements for temporary layoffs, which is, perhaps for that reason, not an important phenomenon in the Netherlands (see also Emerson, 1988).

According to the Unemployment Law, an unemployed worker has several obligations in order to be entitled to UI benefits: he has to (i) prevent unnecessary job loss, (ii) take actions to prevent him from staying unemployed, so he has to search for a job and accept appropriate job offers, register as a job searcher at the public employment office, participate in education and training, etcetera, and (iii) keep the administrative organization informed about everything that is relevant to the payment of the unemployment insurance benefits. The administration of the unemployment benefits system is mainly organized at the level of the industry. If an unemployed worker does not live up to the rules then the administrative organization is authorized, but not obliged, to impose a sanction on that worker.

[4] For example, to get an initial benefits entitlement period of 5 years, the unemployed worker has to have had jobs for at least 40 years and in at least 3 out of the last 5 years prior to the start of the unemployment spell.

Most displaced workers (in the private sector) can, to the extent that they do not immediately move into new jobs, be identified as workers flowing into UI and not receiving sanctions for 'unnecessary job loss'. Because of the institutional arrangements, this definition restricts attention to both 'longer service' workers, although not necessarily workers with long tenure on their last jobs, and to layoffs because of economic reasons. However, especially during some periods in recent history, other social security schemes have played a role as destinations for displaced workers.

Disability Insurance (DI) , arranged by a variety of laws from 1967 (referring to a law from 1930), 1976, 1993, and revised throughout, is a well known alleged escape route for displacement. [5] In the 1970s and 1980s DI was more attractive than UI for both employers and employees in terms of replacement rates and, perhaps, stigma effects. Furthermore, in 1990, there were 139 DI claimants to every 1,000 workers in the Netherlands, and only 78 in Sweden and 43 in Germany (Aarts, Dercksen and De Jong, 1993). As Dutch workers are not likely to run much higher health risks than workers in Sweden and Germany, this suggests that Dutch DI serves more goals than just disability insurance.[6] Policy changes in the late 1980s and the 1990s have been directed at preventing abuse of DI. DI replacement rates have been reduced in 1985 and 1987. Stricter rules concerning, and more extensive monitoring of, disability have been introduced in the 1993 law. As a consequence, the DI stock has, after a continued increase until 1985, now reduced.

Another possible escape route for displaced workers is early retirement. Since the late 1970s there have been arrangements for retirement before the standard retirement age (65 years), which have been formally arranged by law in 1981. There is some circumstantial evidence that early retirement may be relevant to worker displacement: labor force participation rates of Dutch males over 50 years decrease relatively quickly with age compared to other OECD countries (Thio, 1997). However, the use of early retirement to avoid layoff costs in case of displacement is clearly restricted by specific age requirements. Also, early retirement schemes have recently been incorporated in private so called 'flexible (elderly) pension plans', which may reduce the scope for 'abuse' of this scheme. Section 7 provides additional information on the role of DI and early retirement.

Finally, although not a direct destination state for displaced workers, it is relevant to note that the Netherlands provide welfare at the subsistence level for jobless not in UI, DI, or other schemes (currently around US$500 after taxes per month for singles without children).

UI premiums are currently not experience rated at the level of individual firms. However, a small part of cost of UI, roughly 50% of the costs induced by UI benefits paid during the first 13 weeks of unemployment, is covered by premiums related to sectoral unemployment risk.

[5] DI actually consists of two separate arrangements, one for the first 52 weeks of DI, and one for the remaining DI spell. In this paper, we will simply label both arrangements by 'DI'. See CTSV (1997) for details.

[6] It should be noted, however, that Dutch DI also covers disability that is not work-related.

2.3 Wage formation

Wages in the Netherlands are bounded from below by minimum wages. In 1997, the minimum wage is set at 2220.40 Dutch guilders (US$ 1110) per month before taxes and social security premium payments. For workers of ages up to 23 years lower minimum wages hold.

75% of all employees are covered by collective agreements, which are negotiated by central bargaining between (large) firms or employer organizations and unions. The resulting agreements, called CAOs, are usually, but not necessarily, put in terms of lower bounds on the terms of employment, notably the wage. By law of 1927, central agreements reached by worker unions are applicable to non-union employees as well. By law of 1937, collective agreements can be declared binding for entire sectors by Minister of Social Affairs and Employment. Such extensions of the scope of CAOs, shorthanded AW from now on, is indeed common practice. One of the data sets used in our analyses distinguishes between individuals employed under CAO contracts or AW, and employees who are not covered by either of these.

3 Data

There is no equivalent to the US Displaced Worker Supplement for the Netherlands. However, we have access to three micro data sets that contain information on various aspects of displacement:

(i). the Firm Employment (FE) data set,
which provides information on the incidence of displacement, and labor market transitions immediately following displacement over the period 1992-1996,

(ii). an administrative UI data set,
which allows for the analysis of unemployment spells following displacement for all workers entering UI in 1992, and

(iii). the Labor Force Survey (LFS) of the OSA,
a labor force panel survey which can in particular be useful for studying earnings losses following displacement.

3.1 The Firm Employment data

The Firm Employment (FE) data (or *Arbeidsvoorwaardenonderzoek* in Dutch) are firm-worker data collected by civil servants (of the Labor Inspection) of the Ministry of Social Affairs and Employment, and provide information on the incidence of displacement over the period 1992-96. The data are collected yearly (in October 1993-1996) as repeated cross sections from administrative wage records of a sample of firms by means of a stratified 2 steps sampling procedure.

Each year (October), in the first step a sample of firms (about 2,000 in each year) is drawn from the Ministry's own database (which is roughly similar to the firms database of Statistics Netherlands, CBS). In the second step, a sample of workers (about 26,000 per year) is drawn from the records of the firms selected in the first step. The workers are sampled from administrative records of two moments in time, one year before the sampling date and at the sampling date. A distinction is made between employees who are present in both years ('stayers'), workers who are only present in the first year ('leavers') and workers who are only present in the second year ('entrants'). More than 75% of the workers are stayers. Information is obtained on the way leavers separate from firms, which can be used to distinguish between displacement and other separations. Details are discussed in Subsection 4.2.

As the two step sampling procedure is repeated in October 1993, October 1994, October 1995, and October 1996, we have information on separations and displacement between October 1992 and October 1993, October 1993 and October 1994, October 1994 and October 1995, and October 1995 and October 1996. For notational convenience, we will label these four data periods by 1993, 1994, 1995 and 1996 respectively. It should be noted that workers that enter and leave a firm between the two sampling moments are never sampled by this method.

The data set includes additional information on wages, hours worked, days worked and a number of other variables (e.g. age, tender, sex, education, job complexity, occupation, SIC industry codes, firm size and type of wage contract). Table 1 provides some sample characteristics. Appendix A provides detailed information on the variables in the data set.

As both the first step firm sample and the second step worker sample are stratified, we have to reweigh the data before performing any (cross-)tabulation. Firm strata are distinguished by firm size (number of employees) and sector. The number of workers sampled per firm depends on firm size, whether the worker is a new entrant, a stayer or has left in the previous period, and whether the employee is covered by a collective agreement. Weights for the firm strata are computed from the 'Business Statistics' of CBS. For the determination of the weights of the employees, the CBS statistic 'Jobs of Employees' is used.

Finally, it is useful to mention that the data hardly contain any missing cases. Job complexity levels, for example, are known for more than 99% of the workers.

3.2 The UI data set

The UI data are provided by the Dutch Social Security Council (SVr) and are administrative data from the sectoral organizations that implement the unemployment insurance system. The data cover all individuals who started collecting UI benefits in 1992. If necessary, individuals are followed up to September 1993. Note that, for a given individual, the date of inflow into UI as a rule coincides with the date of inflow into unemployment. For each individual we know the duration of being in UI, except when it is right-censored

by the end of the observation period (late 1993). If the UI duration is completed then we know the exit state. As can be learned from the left panel of Table 2, this is usually either employment (56%) or unemployment after completion of UI entitlement (12%). Only 7% of the spells end because of transition into DI, and hardly any UI spell in our sample ends in retirement. We do not have information on events occurring after leaving UI.

We observe whether individuals have had a sanction imposed right at the start of the UI spell. These sanctions are punitive benefit reductions that are applied if the UI applicant is considered to be (partially) responsible for his job loss. Thus, this variable can be used to control for worker-initiated separations, as far as these are not excluded by restricting attention to the UI inflow. Otherwise, the number of explanatory variables is limited due to the administrative character of the data set. Furthermore, the data do not contain the exact magnitude of the individual UI benefits level. However, this is a monotone function of the wage earned before entering unemployment, affected by personal and household characteristics. The wage as well as these characteristics are observed. The data only provide very limited information on the individual maximum UI entitlement, except of course when the individual is observed to complete entitlement.

We create an initial data set by restricting the raw data to cases that can be linked to a local labor market, i.e. for which sector, municipality, and month of inflow are known.[7] This data set contains 219,531 cases, and is used for computing characteristics of local labor markets. Excluding all cases for which one or more regressor variables are missing leaves 209,478 cases. This data set is merged with local labor market characteristics computed from the initial data set, and will be the point of departure for the reemployment duration analysis in Subsection 5.3. Table 2 gives some summary statistics. Appendix B contains an extensive description of the variables.

3.3 The Labor Force Survey of the OSA

The OSA (Netherlands Organization for Strategic Labor Market Research) Labor Supply Panel Survey, or just Labor Force Survey (LFS), is a panel which started in 1985. Presently four waves are available (April-May 1985, August-October 1986, August–October 1988, and August-November 1990). In the LFS a random sample of households in the Netherlands is followed over time. Because the study concentrates on individuals who are between 15 and 61 years of age and who are not full-time students, only households with at least one person in this category are included. All individuals (and in all cases the head of the household) in this category are interviewed. The first wave consists of 4,020 individuals (in 2,132 households). The four waves together contain information on 8,121 individuals.

In every interview, retrospective questions are asked about possible labor market transitions made by the respondent, during the period between the last and current interview. We therefore do not miss transitions made between to consecutive interview dates (assuming recall errors are absent). In case transitions have been made, characteristics of

[7] See Subsection 5.3. We exclude individuals that are living abroad.

the transitions are recorded.

These data allow for a reconstruction of the sequence of labor market states occupied by the respondents and the sojourn times and income levels in these states. This reconstruction covers at most the five year period 1985 until the end of 1990 for respondents who participated in all waves, and some retrospective information on the state occupied at the date of the first interview. [8] We exclude 46 individuals for which the interviews in which they participated are not successive, which leaves the labor market histories of 8,075 respondents.

The following labor market positions are distinguished: employed (job-to-job changes are recorded), self-employed, unemployed, not-in-labor-force, military service, and full-time education (unemployment and not-in-the-labor-force are distinguished by requiring unemployed to actively search for a job). For each transition between two of these labor market states, the respondent is asked to provide a motive or cause (selected from an extensive list of possible motives and causes), and to indicate whether the transition was made voluntarily. This information enables us to distinguish displacement from other separations. We will come back to this issue in Subsection 5.1. Appendix C provides detailed information on the reported motives and causes.

Most respondents do not experience a labor market transition, namely 78%. Almost all respondents make less than 4 transitions (99%). The low number of transitions can be explained by the relatively short observation period (at most 5 years) and the fact that most respondents are breadwinners, who can be expected to have low job mobility. At the date of the first interview, 62% of the respondents is employed, whereas 27% is nonparticipant and 7% is unemployed.

Table 3 provides some characteristics of the sample that is used in this paper. More details on the LFS data can be found in Van den Berg and Ridder (1998) and Van den Berg (1992).

4 Incidence of displacement

In this section we investigate the magnitude and composition of the incidence of displacement. Before analyzing the displacement rate in detail using the 1993-1996 FE data set, we will first assess the time series properties of the rate of displacement over a longer time period.

4.1 The aggregate displacement rate: 1970–1993

Sufficiently long time series can be constructed from aggregate UI data, giving the yearly numbers of new UI cases, and data on the number of employed individuals at risk. The merits of the first series as a measure of displacement have been discussed in the previous

[8] See Van den Berg, Lindeboom and Ridder (1994) for an analysis of attrition using these data. They find that the effects of attrition on estimates of transition models are unimportant.

sections. Although it provides only an imperfect measure of displacement, it is the only measure for which we can construct time series over several business cycles. A more complete measure of aggregate displacement can be computed from the FE data on a much shorter time interval. In the next subsection, both this measure and the differences with the UI measure will be discussed.

Ideally, one would like to measure the second series as the number of unemployed individuals who would be eligible for UI benefits in case of dismissal. Unfortunately, we have to approximate this series by the number of employed individuals paying UI premiums. As this includes individuals with employment histories that are insufficient for UI eligibility, this provides an upper bound to the number of individuals at risk. As a consequence, the rate computed is a lower bound on the true rate of displacement leading to positive unemployment spells.

Figure 1 graphs the annual displacement rate time series constructed in this manner, together with real GDP growth in The Netherlands (percentage change from previous year) for the period 1970-1993. The rate of displacement is clearly trending upwards over the data period, rising from around 4% in 1970 up to 11% in 1993. As to be expected, we also observe strong fluctuations over the business cycle, with steep increases in 1970-1972, 1973-1975, 1979-1982, 1986–1987, and 1990-1993. Comparing this to the superimposed macro indicator, real GDP growth, we see that displacement rates are counter-cyclical. Notable exceptions are 1976-1977, 1984-1985, and 1989-1990, which are all years with decreasing growth and displacement rates. A simple explanation could be that the downturns of the business cycle lead worker displacement, although this seems not true for the early 1970s. However, the correlation between both series is -0.58. A regression of displacement on GDP growth and time shows that displacement changes -0.33 (s.e. 0.12) percentage points for each percentage point increase in real GDP growth, and 0.15 (s.e. 0.03) percentage points per year (R^2 = 0.69). We do not find significant coefficients for one and two year lagged GDP growth.

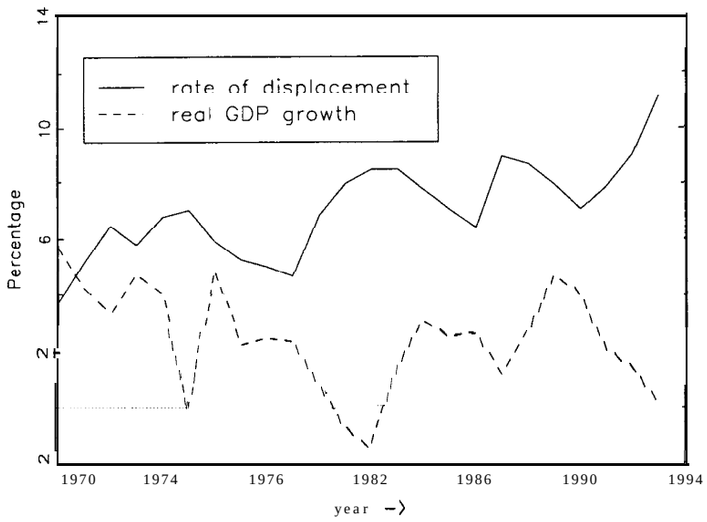
4.2 Displacement rates at the individual level

The FE data can be used to study the variation of displacement over groups of workers.[9] For each separation, information is available that is helpful in identifying displacement. Among other things, the data distinguish layoffs, separations because of expiration of fixed term contracts, and transitions into other jobs, DI, and early and normal retirement." It should be understood that this information comes from administrative records of the separating firm, and is therefore limited by the observational scope of the firm's

'This subsection draws on results from a project on crowding out of low skilled workers, in which three-of the authors are involved at the CPB Netherlands Bureau for Economic Policy Analysis in The Hague.

"Note that we only observe that workers are on a fixed term contract once they separate for that reason, so that we cannot exclude these workers from the data set. However, this is not a serious problem as we condition on tenure, which seems more relevant as a determinant of the risk set for displacement.

Figure 1: The annual rate of displacement



Note: The displacement rate is defined as the ratio of the number of new UI cases and the number of employed paying UI premiums. Sources: (enumerator) *Kroniek* van *de* Sociale *Verzekeringen*, Table 6.1, College van Toezicht Sociale Verzekeringen, Zoetermeer, 1996; (denominator) *Tijdreeksen Arbeid*-srekeningen *1969-l 993: Ramingen* van *het* Opleidingsniveau, een *Tussenstand*, Centraal Bureau voor de Statistiek (Divisie Sociaal-Economische Statistieken, Sector Integratie en Presentatie), Voorburg, 1996; (GDP growth) *Economic Outlook*, OECD, Paris, 1990 and 1995.

administration. For instance, a worker who is given notice of layoff in the near future may immediately quit into another job (before the date of layoff) to avoid unemployment. In this case, the worker is most likely to be recorded as a job-to-job mover, without any reference to the layoff. However, a worker who stays with the firm until the date of layoff is most likely to be recorded as a laid off worker. Then, the data do not provide information on the labor market state occupied by the worker just after displacement. Similar arguments can be made for workers moving into DI or early retirement. For instance, for a worker observed to move into early retirement, we do not have independent information on the circumstances leading to early retirement. Thus, the causes of separations and destinations of labor market transitions following separations are intertwined in the data, and we have to decide upon a proper way to identify displacement.

We have opted for the following method. For all firms, workers under age 60 with tenure of at least one year who are recorded to be laid off are considered to be displaced. As argued above, some displaced workers who immediately find a new job, or move into DI or early retirement, will be excluded by this definition of displacement. To include at least some of these cases, we will label leavers moving into new jobs, DI or early retirement from 'strongly shrinking' firms to be displaced as well. Since there is no a priori reason to pick any particular threshold employment loss level separating strongly shrinking firms from other firms, we have experimented with a number of different criteria. The results

can be found in Table 4. The first question is whether we should focus on net or gross employment (outflow) changes. Using the latter, we will overestimate displacement rates in high turnover sectors, where high simultaneous employment inflow and outflow rates are no exception, whereas using the former we underestimate displacement at restructuring firms. If, for example, Philips displaces all workers at its computer division and at the same time expands its audio and video divisions, we will underestimate the true displacement rate when we use the net employment criterium. The weakest criterium in Table 4 results in an aggregate displacement rate of 7.3%, while the strongest criterium results in an aggregate displacement rate of 5.1%, over the 1993-1996 period. In what follows we use the 'net employment' criterium, mainly because other authors in this volume (Denmark, Belgium) do the same. As we have firm level data, we use a -30% threshold, instead of the -40% threshold employed by the other authors, who apply it to plant level data.

Finally, note that displacement rates calculated with this data set are lower than the UI inflow time series figures because we only observe very few firm closings. Also, the aggregate UI inflow measure does not exclude individuals with sanctions, although we know from the UI data that around 13% of the inflow into UI in 1992 cannot be considered displaced according to the sanction indicator (see Section 3 and Subsection 5.3). Furthermore, we do not exclude low tenure individuals from the UI data. In the analysis of earnings losses with the LFS data we lose one third of the displaced workers if we restrict the sample to workers with tenure of at least 1 year (see Section 6). Clearly, the UI eligibility requirements would prevent most of these low tenure workers to end up in UI, but some overestimation of the incidence of displacement because of this reason with the UI data seems unavoidable. On the other hand, the analyses on the LFS data in Subsection 5.1 also suggest that a large proportion of displaced workers in the Netherlands experiences no unemployment spells at all, which implies that the UI data may well underestimate the true displacement rate.

4.2.1 Descriptive statistics

First we will give a short description of the variation in displacement rates over time and between different categories of workers. Table 5 shows that displacement rates do not differ much between males and females and that displacement rates are much lower for workers with high tenure. For the US similar results are found for this period. In the Netherlands, however, the displacement rate decreases faster with tenure. In both countries, low tenure males have higher displacement rates than low tenure females, whereas high tenure females have higher displacement rates than high tenure males. Table 6 shows that the displacement rates for workers at simple jobs, for workers with little formal training, and for young workers are relatively high. This is in line with standard labor hoarding and human capital theories. It is also interesting to see that workers covered by a collective agreement (CAO) have lower displacement rates than workers whose wage contract is bound (by the minister) to follow CAO contracts of other firms in the same sector (AW), and workers with individual contracts only. The fact that displacement rates are highest

for AW workers could reflect the fact that firms are bound to pay wages that are agreed upon by other firms to such workers. As such, these wages may not reflect the business economic conditions of AVV firms. Finally, we see that displacement rates decline by age.

4.2.2 Logit estimates

Although Table 6 is instructive, it does not reveal the partial effects of the different firm and worker characteristics. We will clarify these effects by estimating two models of the incidence of displacement. It is important to point out that some of the variables that are used as explanatory variables may well be endogenous. Employed workers who have been relatively successful at avoiding displacement in the past may have a high current tenure as well as a low current probability of displacement. Employed workers who by accident have been promoted to a job with fringe benefits that exceed what they can get at other employers may have a high current tenure as well as a high current probability of displacement. Such endogeneity may bias the parameter estimates below.

In the first model we will assume that the displacement decision is made by the firm. We will attach an index D, representing the net marginal benefits of displacing the worker, to each job match. Suppose that the firm will decide to displace the worker if $D > 0$. D will typically be influenced by macroeconomic conditions, which we will represent by calendar time dummies, and by observed and unobserved sectoral and idiosyncratic shocks. Thus, $D = \beta' x + \epsilon$, where x contains time dummies and observable firm and worker characteristics, and ϵ is a random disturbance representing the unobserved components of D. Under the proper assumptions, this specification leads to a binary logit model for the displacement decision. Table 7 gives the corresponding estimates of β. The displacement probability decreases with tenure (up to some level), and with gross hourly wages and it increases with educational and job complexity level, and it is also relatively high for workers without collective contracts and workers employed at large firms.

In the second model, we specify displacement as the outcome of a 2 stage decision process. First, the firm and the worker observe that the surplus of their match has dissipated, and agree to separate. Next, a mode of separation is chosen, for instance displacement. In our second model we therefore estimate a sequential logit model, which specifies (i) the probability that a separation occurs and (ii), conditional on this separation, the probability that the worker is displaced. It should be noted that this second model does not attribute a specific role to displacement, as opposed to other separation modes, whereas the binary model, or any other model that does not specify the separation and displacement decisions separately, does. Estimation results of the sequential logit model can be found in Tables 8 an 9.

Using these estimates, we compute displacement probabilities for different types of workers. We evaluate these probabilities at the estimated parameter values and the mean observed characteristics. Table 10 illustrates the partial effects of the different worker and firm characteristics. Some differences with the explorative results from Table 6 are found. Controlling for other characteristics, the displacement probability is no longer

decreasing with education and job complexity level, and the effect of age is no longer negative. It appears that in particular low wage workers face a large probability to be displaced. According to the sequential logit model, a worker with average characteristics who earns 15 guilders an hour faces a 7% chance to be displaced, whereas this probability is only 1% for a worker who earns 50 guilders an hour. This is not a surprising result if wages are determined by a surplus sharing rule, in which case matches with the highest surplus have the lowest probability to end. Finally, we see that a collective wage contract reduces the probability of displacement. Comparing both specifications, we find that the displacement probabilities predicted by the sequential logit model are somewhat higher than those predicted by the (single) binary logit model.

5 Labor market transitions after displacement

5.1 Labor market states of just-displaced workers

Both the LFS and the FE data provide some information on the labor market states occupied by workers just after displacement.

In the LFS, three transitions qualify for displacement, i.e. job-to-job transitions (*E*–E), transitions from employment to unemployment (E-U), and transitions from employment to not-in-the-labor-force (E-N). Unemployment and out-of-the-labor-force are distinguished by the requirement that unemployed are searching for a job. As noted earlier, the LFS provides a self-reported motive or cause for each transition in the data set, and it provides information on whether or not the transition was made voluntarily. This information can be used to identify displacement. For instance, if 'reorganization/plant closure' is reported as a cause for leaving a job, the worker is clearly displaced. There are several other motives which could indicate displacement. For instance, displacement could also have occurred through DI, in which case disability may be reported as a cause for leaving employment. In deciding which motivation-voluntariness combinations identify displacement, we have to realize that the reported motivations and voluntariness are heavily liable to subjective perceptions (like the distinction between a quit and a layoff). Having this in mind, we have decided to consider transitions with the following motivation-voluntariness pairs as displacement.

The motivation 'I would have lost my job anyway' will most likely be applicable to situations in which people anticipate displacement. In this case we take both voluntary as involuntary transitions, because there seems to be no reason to believe that one or the other excludes displacement. The same holds for the cause 'reorganization/plant closure'. With respect to the motivation 'early retirement' involuntary transitions seem most likely to denote displacement. Voluntary early retirements will probably cover individuals who prefer to stop working irrespective of economic conditions in the firm, and these individuals would have reported 'lost job anyway' in case of displacement. Finally, we have the transitions into DI. For this motivation we distinguish between E-E and E-U transitions on the one hand and ***E-N*** on the other. We think that in case of a ***E-E*** or ***E-U***

transition, both voluntary and involuntary transitions denote displacement, because these people keep working or are searching for a job after the transition, so they are not really incapacitated for work.[11] In case an *E-N* transition is made, we assume that displacement is indicated by voluntary transitions, while involuntary transitions will cover transitions for pure medical reasons.

Table 11 shows the number of displaced workers by transition and motivation in our sample. In total we observe 327 displacements. The large majority involves job to job transitions (70%). As for motivations, in most cases (68%) displacement is indicated by the most clear-cut motivation, 'reorganization/plant closure'. Only a small share is due to DI (17%) or early retirements (1%). If we restrict attention to workers with tenure of at least 1 year, only 162 displacements are left. However, qualitatively similar results hold for this subsample.

As we stated before, the FE data also give some information on the labor market state just after displacement. From the discussion of this data set it should be clear that this labor market state is not observed for those displaced workers who are labeled as being laid off. However, firms are likely to be involved in arranging DI and, in particular, early retirement for workers if these destinations are really used as convenient ways to displace workers, in which case we may expect that these transitions are actually recorded. Similarly, because of employment protection regulation, we may expect that firms are involved in reemploying displaced workers, and that at least some job-to-job transitions of displaced workers are recorded. In any case, the share of layoffs in overall displacement only provides an upper bound to the share of displaced workers ending up in unemployment right after being displaced.

Table 13 compares the layoff rates, job-to-job transition rates, DI inflow rates, and early retirement rates between 30% shrinking firms and other firms. We see that not only the layoff rates are higher at the 30% shrinking firms but also the other separation probabilities. This seems to indicate that at least some displaced workers enter DI or early retirement, or move into another job directly. However, the second row for each type of firms shows that a relatively high share of separations from shrinking firms are labeled as layoffs, and relatively few as job-to-job transitions. So, most of the displacement seems to be captured by layoffs.

5.2 Labor market states 1 year after displacement

It is interesting to see what labor market states displaced workers occupy 12 months after displacement. Table 12 gives the number of individuals in the different labor market states, by type of transition made just after displacement.[12] The table shows that most

[11] Although this may be due to DI legislation. Partly disabled workers have to find a job for their remaining work capacity. We cannot distinguish these cases. However, this rule came into effect in 1987, so it only affects observations in part of our observation period (See Hassink, Van Ours, Ridder, 1997).

[12] The total number of observations is smaller than in Table 11, because in some cases information on sojourn times was missing.

individuals are still in the same state as when they became displaced. We cannot derive strong results on E-U and *E-N* transitions, because of the limited amount of individuals in this category, but for job to job movers it seems that they do not have problems finding steady employment after being displaced.

5.3 Re-employment durations

We analyze re-employment durations following displacement using the 1992 UI inflow data set. We distinguish individuals who have been sanctioned for responsibility for job loss, and individuals who have not been sanctioned. Only the latter are considered to be displaced. The sanctioned individuals may then serve as a 'control' group, where we should acknowledge that this group only contains individuals who are eligible for UI benefits, and no individuals who have for instance quit their jobs, or that have been dismissed for severe misconduct. Also, the groups may differ for two reasons other than cause of separation. First, the 'non-displaced' individuals have been sanctioned, which implies that they will face reduced benefits for at least some period of time. Second, workers are likely to be non-randomly selected into both states, for which we will not directly control.

Table 14 presents summary statistics of re-employment durations by demographic group. As 44% of the durations are right-censored, we compute median durations, in particular median residual durations at 0 and 26 weeks. From the upper panel we learn that the median re-employment duration of all spells is 20.8 weeks. For displaced workers, the median duration is 3.5 weeks shorter than for sanctioned workers. The median residual durations at 26 weeks are 4-5 times larger, implying strong negative duration dependence of the corresponding re-employment hazard rates. It is well known that this can both be explained by 'genuine' duration dependence at the individual level, e.g. because of stigma effects or atrophy of skills, and dynamic sorting because of exit rate heterogeneity (see for instance Lancaster, 1979). The fact that median residual durations are now longer for displaced workers can possibly be traced back to heterogeneity in terms of unobserved and other observed characteristics. Earlier analyses of the same data by Abbring, Van den Berg and Van Ours (1997) indeed show that both negative genuine duration dependence and observed and unobserved heterogeneity play a significant role in explaining the observed duration dependency pattern. The lower panel restricts attention to displaced workers, and gives median durations for various demographic groups.

Apart from the sanction variable, we develop another indicator of displacement, or, more precisely, a proxy for excess firings in the local labor market of each individual. From the UI inflow census we can compute the size of the inflow in UI in each month of 1992 in each Dutch municipality by sector. Thus, we can distinguish local labor markets by municipality and sector, and define excess UI inflow in a local labor market to be the inflow into UI in that market net of the overall average inflow over time, municipality and sector. More formally, if c_{mst} is the inflow in UI in municipality m in sector s in month t, then data on c_{mst} for all municipalities, sectors, and months in 1992 are

regressed on municipality, sector and time dummies, yielding both predicted counts $\hat{c}_{mst}$ and residual counts $\hat{\epsilon}_{mst} = c_{mst} - \hat{c}_{mst}$ for each cell or (m, s, t). Now, each combination (m, s) represents a local labor market, and the $\hat{\epsilon}_{mst}$ is an indicator of excess firings in local labor market (m, s) in month t. We can assign each individual to a local labor market, and use 2 as a regressor in an analysis of re-employment durations. As we will, for computational reasons, only include province indicators, instead of municipality indicators, in the duration analysis, it is useful to also include $\hat{c}$ as a regressor.

The duration model for re-employment durations is specified as a single risk mixed proportional hazard (MPH) model, with the log hazard for reemployment given by

$$\log \theta(t|x, v) = \sum_{i=0}^{6} \lambda_i I_i(t) + x'\beta + v, \tag{1}$$

where $\lambda_i, i = 0, \ldots, 6$, are duration dependency parameters representing levels of a piece-wise constant baseline hazard, and β is the regressor parameter vector. x is a regressor vector containing both the sanction indicator, the cell or local labor market indicators, and other individual characteristics. $I_i(t)$ is an indicator function which equals 1 if $t \in I_i$ and 0 otherwise, where we take (with t in weeks) $I_0 = [0, 8)$, $I_1 = [8, 16)$, $I_2 = [16, 24)$, $I_3 = [24, 32)$, $I_4 = [32, 45)$, $I_5 = [45, 58)$ and $I_6 = [58, \infty)$. We normalize $\lambda_0 = 0$. v is an unobserved component which is assumed to be discretely distributed, so that, with n points of support, $\Pr(v = v_i) = p_i$, for $i = 1, \ldots,$ n, and $p_n = 1 - \sum_{i=1}^{n-1} p_i$. Because of their flexibility and computational convenience, discrete distributions for unobservables are frequently used in MPH analyses.[13] We will fix the number of mass points at n = 2, and perform sensitivity analysis by r-e-estimating the model for higher values of ***n.*** Finally, we treat destinations different from re-employment as randomly right-censoring the re-employment durations. Also, we have right-censoring because of the fact that individuals are only followed until late 1993.

Table 15 shows results from maximum likelihood estimation. The most important finding is that individuals who are displaced according to the sanction indicator, i.e. who do not have sanctions imposed, have approximately 20% higher re-employment rates than sanctioned individuals. Considering the fact that sanctions, if they have any direct effect, are likely to increase x-e-employment rates, this figure provides a lower bound on the difference between displaced and non-displaced workers, given a similar benefits level. The excess firings indicator, the 'residual size of the cell', has a significantly positive effect on re-employment rates, which could be explained as a signalling effect. Workers that are involved in excess, or even mass, firings, are more attractive than workers that are singled out for layoff. This result is consistent with the findings of Gibbons and Katz (199.1) for the US, who find that workers displaced because of plant closing have shorter

[13]The **flexibility of discrete distributions as heterogeneity, or mixture, distributions is illustrated by a result of** Heckman **and Singer** (1984), **who show that in MPH models the non-parametric maximum likelihood estimator of the heterogeneity distribution is a discrete distribution. However, the estimation procedure requires the number of points of support not to be fixed in advance, and estimation of standard errors is not straightforward.**

re-employment durations than workers laid off because of slack work or elimination of a position or shift. It is also interesting to note that the predicted size of the local labor market has a significantly negative effect on re-employment rates, which could be a symptom of congestion effects on local labor markets. It should be noted that this variable is identified on variation between municipalities only, as the model contains full sets of time and sector dummies. Wage has a significantly positive effect on re-employment rates, and age a significantly negative effect (from age 16 onwards). Wald test statistics for the joint significance of the three sets of dummies show that there is significant variation (at a 5% level) across sectors, months of inflow and provinces. Most of the variation in re-employment rates between cells or local labor markets is caused by sectoral heterogeneity.

We also find significant unobserved heterogeneity and negative individual duration dependence of re-employment rates. The table includes an Information Matrix (IM) test on the unobserved heterogeneity parameters (see White, 1982). Chesher (1984) has shown that this test on the equality of the score and Hessian representations of the IM can be interpreted as a test on local parameter variation. In this case, the IM test can be expected to detect additional unobserved heterogeneity, and can be shown to be χ^2 distributed with 2 degrees of freedom. Thus, the IM equality is just rejected at a 5% significance level. However, adding an additional mass point to the heterogeneity distribution does not change the results: two mass points converge to the same value and other parameter estimates are unaffected.

We illustrate the results by the survivor function for the mean individual, which is given by

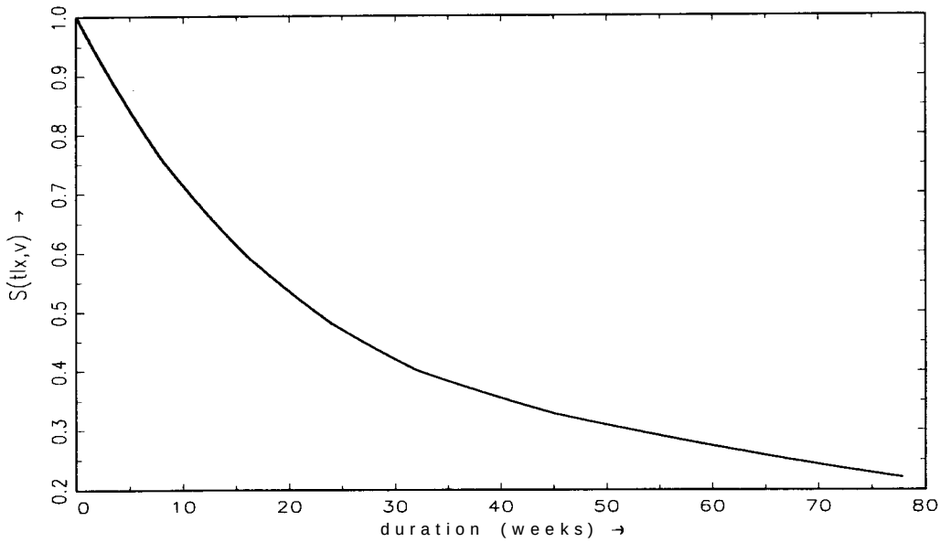
$$S(t|x,v) = \exp\left(-\int_0^t \theta(z|x,v)\mathrm{d}z\right),$$

evaluated at the means of the observed and unobserved covariates. Figure 2 graphs the estimated survivor function. Also, Table 16 gives re-employment probabilities computed with the estimated model, by fixing the unobserved heterogeneity component at its estimated mean and the regressors at the sample mean, and considering one-by-one deviations of regressors from this mean. Of the displaced workers 55% (73%) is re-employed within 26 weeks (52 weeks). For sanctioned individuals these probabilities are slightly lower. We still find strong negative effects of age on re-employment probabilities. Wages have positive effects on re-employment probabilities, *ceteris paribus*, which overturns the results from the raw median estimates.

6 Earnings changes

To analyze possible earnings losses between pre- and post-displacement jobs, three transitions are relevant: *E-N-E*, *E-U-E* and *E-E* transitions. In our sample, we have **1,719** observations on these transitions, including both displacement and other types of separation from the first employment spell. Only one income level is reported for each individual labor market spell. However, under the assumption that earnings do not vary

Figure 2: Estimated survivor function (until re-employment) for the mean UI recipient



within employment spells, the change in earnings between pre- and post-separation jobs equals the change of earnings between the date of separation and the date of entering the first new job. To correct these earnings differentials for inflation, we have used the monthly all-item Consumer Price Index.[14] After this inflation correction, there are 1,551 observations left.[15] If we restrict our sample to workers with tenure of at least one year in the first employment spell, we have 668 observations.[16]

The average post- and pre-separation earnings ratio in this sample is 1.24, with a standard error equal to 0.02. For the subsample of displaced individuals (232 observations) this average equals 1.18, with a standard error equal to 0.04. For our subsample of workers with sufficient tenure we find an average earnings ratio of 1.24 (0.02) for all workers, and of 1.14 (0.03) for displaced workers (116 observations). In either case, real earnings rise significantly between two consecutive employment spells. Because there is no significant difference between the ratio for all workers and for displaced workers (their 95% confidence intervals are overlapping), this indicates that displacement has no significant effect on future earnings. To investigate this further, we have have regressed the log real

[14]Source: CBS, *Maandschrift*, September 1988 and January 1991.

[15]There are several reasons for this loss of observations. First, the starting date of the first observed labor market state can be missing. In this case the different states cannot be linked to calendar time, which- is needed for the inflation correction. Second, the starting date may be inconsistent with the reported sojourn time, given the date of the first interview. Finally, one or more sojourn times may be missing.

[16]Note that most observations are lost because tenure is missing: tenure is observed for 1,069 of the 1,551 observations. Of these 1,069 cases, 168 cases concern displacement. Of the 668 observations with sufficient tenure, 116 concern displacement, which is 69% of 168. This number is referred to in the discussion of the UI inflow measure in Subsection 4.2.

earnings ratio on tenure in the first employment spell, the duration of the intervening non-employment spell, defined to be 0 for *E-E* cases, a dummy variable indicating whether the separation concerns displacement, and some additional controls. The estimation results are reported in Table 17.

The estimation results confirm the preliminary conclusions from the comparison of the averages. Displacement does not have a significant effect on earnings after a separation. Moreover, the first column shows that the effect of displacement is very small if we do not include the tenure criterion in the displacement definition. In column 2 we find some evidence of a negative effect of displacement if we restrict the displacement indicator to separations of workers with at least 1 year of tenure. This is confirmed by estimates for the tenure-restricted sample in the third column. Also, in all cases we find a significantly negative effect of the length of the spell of intervening joblessness. Thus, workers who have been without work longer experience smaller earnings gains. This could be seen as negative duration dependence and can be explained by stigma effects or loss of skills. Log tenure is generally insignificant, but the results in the second column indicate that workers with tenure below 1 year face significantly smaller earnings gains.

7 Retirement and disability

The results from Subsections 5.1 and 5.2 suggest that early retirement and DI have been used to facilitate displacement. The LFS data (Tables 11 and 12) show that at least some displaced workers have persistently retired from the labor force, either by early retirement or in DI, in the 1985-1990 period. The tables also indicate that this concerns at most 10% of all displaced workers. More surprisingly, the FE data (Table 13) attribute some role to both early retirement and DI in the 1993-1996 period, even though DI legislation has undergone major changes to avoid improper use (see Section 2).

The improper use of DI and the role of early retirement have received ample attention in the Dutch policy debate, and numerous empirical studies on these issues exist. Although these usually do not focus on displaced workers per se, some of these papers offer insights that are useful in the context of displacement.

A series of papers has sought to explain the relatively high DI caseload in the Netherlands (see Hassink, Van Ours, and Ridder, 1997, for an overview). It is found that up to 50% of the DI inflow before the reforms in the late 1980s is related to 'redundancy of workers', and not to actual health problems. This may appear as a rather extreme conclusion, but it is consistent with the relatively high DI rates in the Netherlands (see Section 2). Hassink et al., using a panel survey of firms by the OSA, estimate that still 10% of the DI inflow in the late 1980s (after the 1980s reforms) is related to redundancy. Although they do not investigate DI in the course of the 1990s, it can be expected that the 1993 reforms have reduced this number much further.

Thio (1997) uses a 1993 survey among elderly head of households and their partners, conducted by the Centre for Economic Research on Retirement and Ageing (CERRA).

Thio uses a subsample of heads of household of 53-63 years old who were not working ('retired') at the time of the interview, have at least been working up to age 40, and who have been working for at least 3 months with their last employer. The data distinguish various self-reported reasons for retiring from their last job. One group of reasons corresponds to layoffs for economic reasons, or displacement. Other categories distinguished are quits, health-related separations, separations related to working conditions, and separations because of family reasons. The data also distinguish various exit routes for retirement, among which are early retirement and DI. In the sample of retired heads of household used, 37% are on DI and 43% in early retirement. The average retirement age is 54 years.

In 96% of the DI cases, health is reported as a reason for retirement, and in 86% as the primary reason. In 24% of the DI cases, layoff is reported as a reason, but in only 8% as the primary reason. This seems consistent with the results found by Hassink et al., as the average time between retirement and the survey is 5 years, implying that the results are roughly applicable to the late 1980s. Furthermore, as the data apply to the period before the major DI reform of 1993, the results are again likely to overestimate the current role of DI in facilitating displacement. Of individuals in early retirement, 37% report layoff as a reason for retirement, and 26% report layoff as the primary reason. Thus, it seems that a significant share of the inflow into early retirement is related to displacement. Finally, it is shown that 60% of retirement because of layoffs, including retired in UI and other schemes, is concentrated among 54-59 years old, and only 9% concerns individuals of age 60 and up.[17]

8 Concluding remarks

In this paper we have analyzed the incidence and consequences of displacement in the Netherlands. In the next stage of this project this paper will be merged with similar analyses for the US. The scope for direct comparisons between the US and the Netherlands will be somewhat hampered by differences in the available data sets: there is no equivalent to the most obvious US data source, the Displaced Worker Supplement, in the Netherlands. One specific and final comment concerns the comparison of wage discounts between the two countries.

This comparison is hampered by the different character of transitions following displacement between countries. In the Netherlands, non-employment durations are usually much larger, and we have found some evidence that many more displaced workers move into alternative employment directly.[18]

[17] By construction of the data set, the remainder is in the 40–53 age group.

[18] Layard, Nickel1 and Jackman (1991) provide a steady state estimate of unemployment durations of around 3 months for 1988 for both countries (see Layard et al., 1991: Table 1 of Chapter 5. Furthermore, Table 2 shows that this is fairly typical of the period 1962-1989). In the Netherlands, however, mean unemployment durations are usually larger than one year: Layard et al. even give a steady state estimate of 25 months for 1988. Also, median m-employment durations in our 1992 UI data set are 6 weeks longer

With long post-displacement non-employment spells, issues like loss of skills are likely to be more relevant. This implies that wage discounts per se are not easy to interpret, and hard to measure properly. These problems have recently been encountered by Cohen, Lefranc and Saint-Paul (1997), who compare the US and French labor markets. Using the *Enquête Emploi*, collected by the INSEE, for Prance and the Panel Study of Income Dynamics for the US, they find that wage discounts after displacement are roughly similar in both countries. However, the discussion following the paper shows that it is not easy to draw any clear conclusions from this.

Long non-employment durations in the Netherlands seem less of a problem as displaced workers apparently experience less non-employment spells than their US counterparts. However, this may be related to the fact that Dutch workers face stronger employment protection, and may be able to bargain over alternative employment in case of displacement. As such, the immediately re-employed may have quite different characteristics than the same group of displaced workers in the US. Also, the threat of long unemployment spells may stimulate workers anticipating displacement to search actively for another job while still employed.

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than median reemployment durations in the US data set.a This is remarkable, as our data set excludes workers entering other schemes and hardly ever returning to employment, and includes at least some short tenure workers, who can be expected to be more mobile. The finding that residual m-employment durations increase dramatically with duration is consistent with this.

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Appendices

A The FE Data

The Firm Employment (FE) data were collected by the Dutch 'Labor inspection', which is part of the Ministry of Social Affairs and Employment, and contains administrative data on workers employed in both the private and the public sector. For our analyses we only use private sector workers below 60 years of age with at least 1 year of tenure (unless stated otherwise). Below we give information on the construction of some of the key variables.

- **displacement:**
  All workers with at least 1 year of tenure who are laid off, and, additionally, all separations because of disability (DI), early retirement and transitions into other jobs directly at firms that face a (net) loss of more than 30% of their work force.
- **other outflow:** Workers who separate from a (non-30%-shrinking) firm because of (early) retirement, disability (DI), end of test-period, transition into an other job, or expiration of a contract with a temporary work office.
- **job complexity level:**
  We use the following classification of job complexity levels:
  - low: Simple, generally repeating, activities that take place under direct supervision. Little or no formal schooling or experience is required.
  - intermediate: Less simple activities that partly take place without direct supervision. Administrative or technical knowledge is often required.
  - high: Activities that require a higher level of knowledge and experience, and that take place without direct supervision. Also, management activities that require an academic or comparable level.
- **tenure:**
  Measured in years (difference between starting and sampling dates).
- **wage:**
  Monthly wages (including extra time payments, profit shares, etc.) and hours worked are measured very accurately. We calculate gross hourly wages for each worker and deflate the wage by the all-item Consumer Price Index.
- **wage agreement:**
  We distinguish 3 types of wage contracts. Most workers have a collective agreement (CAO) which is negotiated at the sectoral level, or by leading firms within a sector. The Minister of Social Affairs and Employment has the right to force all other firms within a sector to follow an existing CAO, which is labeled by AW. The remaining

workers have bilateral employment contracts only. These workers are in general employed at higher positions.

- **part-time/full-time:**
  Part-time refers to working less than 100% of the regular number of hours.

- **education:**
  Education refers to years of completed education. When it takes 4 years to complete higher vocational education, the reported years of schooling will be 4 years (plus the number of years it takes to finish high school and elementary school) even if the worker has spent more or less years to complete his actual higher vocational degree.

B The UI data

The UI data set is provided by Dutch Social Security Council (SVr) and contains administrative data from the sectoral organizations that implement the unemployment insurance system. All cases of individuals applying for unemployment benefits in 1992 were included in the database, and, if necessary, followed up to September 1993. We excluded all cases that started collecting benefits before 1992, or for which one or more exogenous variables are missing. Below we give some details on measurement and construction of some of the variables.

- **duration unemployment insurance benefits:**
  Both the duration of the insurance benefits period and the destination state of individuals whose benefits expire are observed. Durations are observed in intervals. 13 biweekly intervals cover the first half year. Then we have one 6-week interval, for durations between 26 and 32 weeks. On the interval 32 to 318 weeks we are able to distinguish 22 quarterly duration classes. The remaining durations are observed as being 318 weeks or longer. As we are not considering benefit payments that started before 1992, and we are only following benefits recipients up to September 1993, there is no right-censoring because of observations in the residual class 318 weeks and higher. We observe, however, unemployment spells that are still lasting at the end of September 1993, and destinations of transitions out of unemployment insurance different from employment. In our analysis, both are considered to be right-censored.

- **sanctions:**
  The data set contains a variable indicating whether a sanction has been imposed at the start of the UI spell (because of responsibility for becoming unemployed). We do not use information on sanctions that are imposed during the UI spell, as these are related to behavior during the unemployment spell and not to any behavior that may have lead to displacement.

- **age:**
  Age is computed as the age in years at the start of the individual's benefits spell.

- **wage:**
  Wage is the daily wage before taxes earned by the individual before becoming unemployed. It is the wage that is used by the administrative organization to compute the level of the benefits. It is observed in 43 intervals of width 10 guilders up to 430 guilders, and a residual interval for those earning over 430 guilders. The continuous wage variable is defined as the average wage in each wage class, or 435 guilders for those in the highest wage class. An additional dummy is included for the highest wage class.

- **provinces and urbanization:**
  Municipality codes are observed and recoded to provincial and urbanization dummies. The provinces are Groningen, Friesland, Drenthe, Overijssel, Flevoland, Gelderland, Noord-Brabant, Limburg, Utrecht, Noord-Holland, Zuid-Holland, and Zeeland. Urbanized areas are municipalities that are highly urbanized according to Statistics Netherlands (CBS): Amsterdam, Delft, The Hague, Groningen, Haarlem, Leiden, Rijswijk, Rotterdam, Schiedam, Utrecht, Vlaardingen, and Voorburg.

- **part-time/full-time:**
  Like the wage information this variable refers to the employment situation of the benefits recipient preceding the unemployment spell. Full-time refers to working 100% or more of the regular number of hours. Part-time refers to working less than 100% of the regular number of hours.

C Reported motives and causes in the LFS data

The OSA (Netherlands Organization for Strategic Labor Market Research) Labor Force Survey follows a random sample of households in The Netherlands over time. On the basis of these data, sequences of labor market states occupied by the respondents are reconstructed. The following labor market states are distinguished: employed, self-employed, unemployed, not-in-labor-force, military service and full-time education. For each transition between two of these labor market states, the respondent is asked to provide a motive or cause selected from an extensive list of possible motives and causes:

(i) . Due to 'Tweeverdienerswet' (Law on double-income households)
(ii). I wanted a more interesting job
(iii).. I wanted a more secure job
(iv). I wanted a job with better career opportunities
(v). I wanted a better paying job
(vi). I would have lost my job anyway
(vii). Unemployment benefits are sufficient

(viii). I wanted a job
(ix). Reorganization/plant closure
(x). Bankruptcy
(xi). Family business closed/reorganized
(xii). Laid off for other reasons
(xiii). Early retirement
(xiv). Retired, gone living off my investments
(xv). Disability
(xvi). Marriage
(xvii). Birth of a child
(xviii). Move of household or partner
(xix). My family situation did not allow it anymore
(xx). I wanted my old job back
(xxi). I wanted to earn my own wage or an extra wage again
(xxii). My family situation allowed it again
(xxiii). I wanted to be more among people
(xxiv). I wanted to attend classes again
(xxv). I just finished my education
(xxvi). I had to fulfill military service
(xxvii). I just fulfilled military service

D Tables

Table 1: FE data: Weighted means (1993-1996)

variable		mean
year	1993	23%
	1994	25%
	1995	24%
	1996	28%
gender	female	36%
	male	64%
coll. agreement	CAO	72%
	AVV	5%
	none	23%
job complexity level	low	18%
	intermediate	71%
	high	11%
education (years)		11.3
age (years)		36.6
tenure (years)		8.5
real gross hourly wage (guilders)		32.2
total # workers		101,327

Note: Workers older than 60 years are excluded. Also, workers with tenure below 1 year have been excluded. 'year' refers to sampling year. Note that data on two consecutive years for each worker are collected at a single sampling date, October of the sample year, by reviewing the administrative records of both the sampling date and one year before the sampling date. 'CAO' refers to coverage by a collective agreement, 'AVV' to coverage by a mandatory extension of such an agreement.

Table 2: UI data: Some characteristics

			mean	st. dev.
# spells	**209,478**	non-displaced (sanction)	13%	
terminated by		age (years)	32.0	10.9
re-employment	56%	daily wage (guilders)	122.5	65.9
maximum entitlement	12%	female	43%	
transition into DI	7%	urban	17%	
end of observation period	17%	part-time	29%	
other	8%	married	40%	

Note: Wages are observed in 10-guilder intervals and are right-censored at 430 guilders. Sample mean and standard error of wages are computed by recoding wages to mean interval wages, or to 435 guilders if right-censored. 'Other' includes (among other things) reaching the age of 65 years, death, military service and self-employment, all of which occur in less than 0.5% of the cases.

Table 3: LFS earnings sample: Sample characteristics

	all workers		tenure $\geq$ 1 yr.	
variable	**mean**	**st.dev.**	**mean**	**st.dev.**
ratio post- and pm-separation earnings	1.22	0.62	1.24	0.55
tenure (months)	44.4	71.0	67.5	81.5
age (years)	30.0	8.1	31.0	8.3
spell (months)	0.7	3.5	0.6	3.3
i.d., nonzero spells only	8.8	9.5	10.4	10.1
education primary/lower sec.	36%		34%	
intermediate	41%		43%	
higher	18%		19%	
university	5%		5%	
d^{I}_{displ}	16%			
d^{II}_{displ}	11%		17%	
female	40%		36%	
married/cohabitating	69%		75%	
non-Dutch	3%		3%	
total # individuals	1069		668	
# nonzero intervening spells	81		37	

Note: 'Ratio post- and pre-separation earnings' refers to real after-tax monthly earnings in the pre-separation and the first post-separation jobs. 'Tenure' is tenure on the preseparation job in months, and is also used to select the cases in the right panel. 'Age' denotes the age at the date of the first interview in years. 'Spell' is the duration of the non-employment spell between the pre- and post-separation jobs in months (0 for ***E-E cases).*** d^{I}_{displ} is a dummy indicating whether the separation was caused by displacement (1) or not (0), using the definition discussed in the main text. d^{II}_{displ} equals d^{I}_{displ} with the additional requirement that the tenure of the displaced individual equals at least 1 year.

Table 4: Reported labor market states of workers at extremely shrinking firms: 1993-1996 (in % of employment at all firms)

criterium		% firms	layoff	new job	early retir.	DI	displacement
employment	-20 %	9.1	0.5	0.3	0.1	0.0	5.6
(net change)	-30 %	5.2	0.3	0.1	0.0	0.0	5.2
	-40 %	2.9	0.2	0.1	0.0	0.0	5.1
outflow	-20 %	36.5	2.0	1.2	0.2	0.1	7.3
(gross change)	**-30 %**	21.6	1.2	0.7	0.1	0.1	6.4
	-40 %	13.4	0.9	0.5	0.1	0.0	5.9

Note: Based on weighted FE data. Workers older than 60 years are excluded. Also, workers with tenure below 1 year have been excluded. 'Displacement' indicates total displacement ('layoffs', excluding 'layoffs during test periods', at all firms, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at shrinking firms) as a percentage of total employment. Firm shares are computed among firms with workers in the selected category.

Table 5: Annual displacement rates by tenure during 1993-1995 period (in %)

tenure (years)	all workers	males	females
all	**4.1**	4.2	4.0
< 1	10.1	11.0	8.9
1-2	6.7	7.6	5.6
3-4	4.3	4.8	3.6
5-9	2.7	2.8	2.5
≥ 10	1.6	1.6	1.7

Note: Based on weighted FE data. Workers older than 60 years are excluded. Displacement is identified with 'layoffs' (excluding 'layoffs during test periods') at any firm, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at firms with net employment changes < -30%.

Table 6: Displacement and other separation frequencies 1993-1996 (in %)

variable		no transition	displaced	other outflow
all		89.0	5.2	5.8
year	1993	87.2	7.5	5.3
	1994	90.7	2.6	6.7
	1995	89.1	2.4	8.5
	1996	88.9	8.0	3.1
gender	female	87.8	5.3	6.9
	male	89.7	5.2	5.2
tenure (years)	< 1	88.8	5.7	5.5
	1-2	82.9	8.0	9.0
	3-4	87.9	5.9	6.2
	5-10	91.7	4.1	4.2
	> 10	94.1	2.1	3.8
coll. agreement	CAO	89.4	4.8	5.9
	AVV	86.7	6.8	6.4
	none	88.0	6.3	5.7
job complexity level	low	84.1	6.7	9.3
	intermediate	90.0	4.9	5.1
	high	91.5	4.3	4.2
education (years)	≤ 10	88.1	5.4	6.5
	10 < . < 15	90.3	4.8	4.9
	≥ 15	90.1	5.3	4.6
age (years)	18-19	74.9	10.9	14.2
	20-29	84.0	8.0	8.1
	30-39	90.2	5.0	4.8
	40-49	93.4	3.3	3.3
	≥50	90.8	2.4	6.9

Note: Baaed on weighted FE data. Workers older than 60 years are excluded. Also, workers with tenure below 1 year have been excluded (except in the row giving results for these workers). Displacement is identified with 'layoffs' (excluding 'layoffs during test periods') at any firm, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at firms with net employment changes < -30%. 'CAO' refers to coverage by a collective agreement, 'AVV' to coverage by a mandatory extension of such an agreement.

Table 7: Binary logit estimate of probability of displacement

	estimate	(s.e.)
intercept	**-22.46**	**(2.37)**
log age	16.59	(1.48)
(log age)^2	**-2.36**	**(0.21)**
female	**-0.21**	**(0.04)**
log tenure	**-0.34**	**(0.05)**
(log tenure)^2	**-0.043**	**(0.02)**
log wage	**-3.79**	**(0.26)**
(log wage)^2	**0.39**	**(0.04)**
part-time	**-0.65**	**(0.05)**
education (years)	**-0.56**	(0.08)
job complexity		
low	**-0.44**	**(0.08)**
intermediate	**-0.43**	**(0.08)**
occupation		
simple technical	0.11	(0.12)
administrative	**0.26**	**(0.12)**
management	**0.04**	**(0.13)**
services	**0.14**	**(0.12)**
commercial	**0.30**	**(0.12)**
creative	**-0.05**	**(0.17)**

	estimate	(s.e.)
wage agreement		
CAO	**-0.09**	**(0.03)**
AVV	**-0.03**	**(0.07)**
sector		
manufacturing	**-0.05**	(0.10)
construction	0.16	(0.10)
trade	**-0.23**	(0.10)
restaurants etc.	**0.43**	**(0.12)**
transport, comm.	-0.11	(0.11)
financial	**0.07**	**(0.10)**
health	**-0.05**	**(0.10)**
firm size		
10–19	-0.13	(0.05)
20-49	-0.21	(0.05)
50–99	**-0.37**	**(0.06)**
100-199	**-0.27**	**(0.05)**
200-499	**-0.02**	**(0.05)**
≥500	**0.42**	**(0.05)**
year = 1993	**-0.26**	**(0.04)**
year = 1994	-1.39	(0.05)
year = 1995	-1.01	(0.05)
log $\mathcal{L}$	-20,509.90	
N	100,094	

Note: Logit estimate with dependent states 'displaced' and 'not displaced' (reference state). Based on weighted FE data. Workers older than 60 years or with tenure below 1 year are excluded. Displacement is identified with 'layoffs' (excluding 'layoffs during test periods') at any firm, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at firms with net employment changes < -30%. Wages are real gross hourly wages (in Dutch guilders) including extra time payments, profit shares, etcetera. Age and tenure are measured in years. 'CAO' refers to coverage by a collective agreement, 'AVV' to coverage by a mandatory extension of such an agreement. Firm size is measured by the number of employees. Reference states are 'male', 'full-time', 'high job complexity', 'IT', 'no collective wage agreement ', 'agriculture/mining', 'firm with < 10 workers', and 'year = 1996'.

Table 8: Logit estimate of probability of separation (first stage of sequential logit)

	estimate	(s.e.)		estimate	(s.e.)
intercept	-5.27	(1.54)	**wage agreement**		
log age	0.17	(0.96)	CAO	-0.04	(0.03)
(log age)^2	0.01	(0.14)	AVV	-0.04	(0.05)
female	-0.06	(0.03)	**sector**		
log tenure	-0.52	(0.03)	manufacturing	-0.03	(0.07)
(log tenure)^2	0.04	(0.01)	construction	0.18	(0.07)
log wage	-3.33	(0.18)	trade	-0.20	(0.07)
(log wage) ^{2}	0.34	(0.02)	restaurants etc.	0.43	(0.09)
part-time	-0.39	(0.03)	transport, comm.	-0.03	(0.08)
education (years)	-0.01	(0.01)	financial	0.07	(0.07)
job complexity			health	-0.03	(0.08)
low	-0.33	(0.06)	**firm size**		
intermediate	-0.28	(0.05)	10–19	-0.02	(0.04)
occupation			20–49	-0.06	(0.04)
simple technical	-0.08	(0.09)	50-99	-0.11	(0.04)
administrative	0.03	(0.09)	100–199	-0.05	(0.05)
management	-0.07	(0.10)	200-499	0.13	(0.04)
services	-0.02	(0.09)	$\geq$ 500	0.52	(0.04)
commercial	0.16	(0.09)	year= 1993	0.003	(0.03)
creative	0.06	(0.12)	year= 1994	-0.42	(0.03)
			vear= 1995	0.23	(0.03)
			log $\mathcal{L}$	-34,848.27	
			N	100,094	

Note: Logit estimate with dependent states 'leave' and 'stay' (reference state). Based on weighted FE data. Workers older than 60 years or with tenure below 1 year are excluded. Wages are real gross hourly wages (in Dutch guilders) including extra time payments, profit shares, etcetera. Age and tenure are measured in years. 'CAO' refers to coverage by a collective agreement, 'AW' to coverage by a mandatory extension of such an agreement. Firm size is measured by the number of employees. Reference states are 'male', 'full-time', 'high job complexity', 'IT', 'no collective wage agreement', 'agriculture/mining', 'firm with < 10 workers', and 'year = 1996'.

Table 9: Logit estimate of probability of displacement conditional on separation (second stage of sequential logit)

	estimate	(s.e.)		estimate	(s.e.)
intercept	-29.77	(2.94)	**wage agreement**		
log age	18.16	(1.83)	CAO	-0.12	(0.05)
(log age)^2	-2.65	(0.26)	AVV	0.10	(0.10)
female	-0.45	(0.05)	**sector**		
log tenure	0.09	(0.06)	manufacturing	0.07	(0.14)
(log tenure)^2	-0.07	(0.02)	construction	0.12	(0.14)
log wage	0.26	(0.35)	trade	0.03	(0.14)
(log wage)^2	-0.07	(0.05)	restaurants etc.	0.20	(0.17)
part-time	-0.20	(0.06)	transport, comm.	0.13	(0.16)
education (years)	0.04	(0.01)	financial	0.17	(0.15)
job complexity			health	0.03	(0.17)
low	-0.49	(0.11)	**firm size**		
intermediate	-0.49	(0.10)	10–19	-0.16	(0.07)
occupation			20-49	-0.03	(0.07)
simple technical	0.35	(0.08)	50-99	-0.49	(0.08)
administrative	0.45	(0.08)	100–199	-0.52	(0.08)
management	0.12	(0.13)	200-499	-0.17	(0.07)
service	0.19	(0.18)	$\geq$ 500	-0.03	(0.07)
commercial	0.18	(0.18)	year= 1993	-0.59	(0.06)
creative	0.05	(0.25)	year= 1994	-1.90	(0.06)
			year= 1995	-2.25	(0.06)
			log $\mathcal{L}$	-9,089.40	
			N	13,145	

Note: Logit estimate with dependent states 'displacement' and 'other outflow' (reference state). Based on weighted FE data on 'leaving' workers. Workers older than 60 years or with tenure below 1 year are excluded. Displacement is identified with 'layoffs' (excluding 'layoffs during test periods') at any firm, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at firms with net employment changes < -30%. Wages are real gross hourly wages (in Dutch guilders) including extra time payments, profit shares, etcetera. Age and tenure are measured in years. 'CAO' refers to coverage by a collective agreement, 'AW' to coverage by a mandatory extension of such an agreement. Firm size is measured by the number of employees. Reference states are 'male', 'full-time', 'high job complexity', 'IT', 'no collective wage agreement', 'agriculture/mining', 'firm with < 10 workers', and 'year = 1996'.

Table 10: Simulated displacement and other separation probabilities (in %)

	binary logit		sequential logit		
variable	**not displ.**	**displ.**	**stay**	**displ.**	**other**
total population					
	97.5	2.5	90.8	3.6	5.6
year					
1993	96.4	3.6	90.4	5.1	4.6
1994	95.4	4.6	93.1	1.6	5.3
1995	98.3	1.7	88.2	2.0	9.7
1996	95.4	4.6	90.4	3.1	6.4
gender					
female	97.8	2.2	91.1	2.9	6.0
male	97.3	2.7	90.6	4.0	5.4
tenure (years)					
1	**95.0**	5.0	82.8	7.3	9.9
2	96.1	3.9	87.2	5.5	7.3
4	97.1	2.9	90.2	4.1	5.7
10	98.1	1.9	92.8	2.7	4.5
20	98.7	1.3	94.1	1.9	4.0
wage agreement					
CAO	97.6	2.4	90.4	3.7	6.0
AVV	97.4	2.6	90.4	4.2	5.5
no collective wage agreement	97.4	2.6	90.6	3.8	5.6
job complexity level					
low	97.7	2.3	91.4	3.2	5.3
intermediate	97.6	2.4	91.0	3.4	5.6
high	96.4	3.6	88.5	5.7	5.8
education					
low	97.6	2.4	90.9	3.4	5.7
intermediate	97.4	2.6	90.8	3.7	5.5
high	97.2	2.8	90.6	4.1	5.3
age (years)					
20	98.2	1.8	93.8	0.0	6.2
30	96.7	3.3	91.1	4.3	4.5
40	96.8	3.2	90.6	4.2	5.3
50	97.6	2.4	90.1	3.3	6.6
wage (guilders)					
15	94.8	5.2	83.2	7.0	9.8
20	96.6	3.4	88.1	4.8	7.1
40	98.7	1.3	94.8	1.9	3.3
50	99.1	0.9	96.1	1.1	2.7

Note: Based on logit estimates (see Tables 7–9), evaluated at the mean characteristics of the population over the period 1993-1996. Displacement is identified with 'layoffs' (excluding 'layoffs during test periods') at any firm, and, on top of that, transitions into 'new jobs', 'early retirement' and 'DI' at firms with net employment changes $< -30\%$. 'CAO' refers to coverage by a collective agreement, 'AVV' to coverage by a mandatory extension of such an agreement.

Table 11: Displacement by motivation and transition

all displaced workers							
		motivation					
		1	2	3	4	5	all
transition	E-E	30	162	1	37		230
	E-U	6	47	0	15		68
	E-N	7	14	3		5	29
	all	43	223	4	52	5	327
workers with tenure $\geq$ 1 year							
		motivation					
		1	2	3	4	5	all
transition	E-E	19	76	1	17		113
	E-U	1	21	0	10		32
	E-N	2	11	1		3	17
	all	22	108	2	27	3	162

Note: Based on the LFS. ***E-E*** denotes job-to-job transitions, ***E-U*** denotes employment-to-unemployment transitions, and ***E-N*** denotes employment-to-not-in-labor-force transitions. Rows correspond to self-reported combinations of motivation for and voluntariness of transitions: 1 = 'would have lost job anyway', 2 = 'reorganization or plant closure', 3 = 'involuntary early retirement', 4 = 'DI', and 5 = 'voluntary disability' ***(E-N*** only).

Table 12: Labor market state 1 year after displacement by transition

all displaced workers								
		labor market state						
		E	*S*	*U*	N	*M*	*F*	all
transition	E-E	143	0	3	1	0	0	147
	E-U	17	2	27	1	0	1	48
	E-N	4	0	0	18	0	0	22
	all	164	2	30	20	0	1	217
workers with tenure $\geq$ 1 year								
		labor market state						
		E	*S*	*U*	*N*	*M*	*F*	all
transition	E–E	75	0	1	1	0	0	77
	E–U	6	1	17	0	0	1	25
	E–N	2	0	0	12	0	0	14
	all	83	1	18	13	0	1	116

Note: Based on the LFS. ***E-E*** denotes job-to-job transitions, ***E-U*** denotes employment-to-unemployment transitions, and ***E-N*** denotes employment-to-not-in-the-labor-force transitions. Furthermore, ***E*** = 'employed', *S* = 'self-employed', *U* = 'unemployed and searching', N = 'not-in-labor-force', ***M*** = 'military service', and ***F*** = 'full-time education'.

Table 13: Reported labor market states of separated workers by net employment change

firms with net employment changes < -30%				
	layoff	new job	early retirement	DI
% of all workers	21.9	8.4	2.8	1.3
% of outflow	41.5	16.3	5.5	2.5
other firms				
	layoff	**new job**	**early retirement**	DI
% of all workers	4.5	3.0	0.6	0.4
% of outflow	43.9	28.8	5.2	3.6

Note: Based on weighted FE data. Workers older than 60 years are excluded. Also, workers with tenure below 1 year have been excluded.

Table 14: Median residual re-employment durations (weeks)

all workers		
	at 0 weeks	at 26 weeks
all	20.8	102.9
sanction indicator		
non-displaced	23.9	86.2
displaced	20.4	104.6
displaced workers		
	at 0 weeks	**at 26 weeks**
age (years)		
< 30	14.0	77.4
$30 \leq . < 40$	23.2	**91.3**
$40 \leq . < 50$	27.2	(∞)
≥ 50	(∞)	(∞)
daily wage (guilders)		
< 80	22.0	93.2
$80 \leq < 110$	26.6	**106.9**
$110 \leq . < 150$	**15.5**	**97.7**
≥ 150	**21.4**	(∞)
gender		
female	25.8	93.3
male	17.2	105.4
urbanization		
urban	25.5	**100.0**
not urban	19.7	106.5
hours		
part-time	29.9	101.5
full-time	18.0	107.9
marital status		
married	32.3	**109.2**
not married	15.4	92.0

Note: Based on the UI data. Durations are observed in intervals and may be right-censored. Medians are computed using the actuarial method, i.e. assuming that censoring and re-employment durations are uniformly distributed within observational intervals. 'co' is used to denote medians larger than the longest completed spell observed, i.e. that are beyond the scope of the data set.

Table 15: MPH estimates re-employment durations

	estimate	(s.e.)
non-displaced (sanction)	-0.18	(0.04)
sanctions/cell member	0.01	(0.07)
predicted size cell ($\hat{c}$)	-1.42	(0.15)
residual size cell (i)	0.35	(0.05)
log age	0.89	(0.28)
$(\log \text{age})^2$	-0.93	(0.12)
log wage	0.18	(0.03)
$(\log \text{wage})^2$	0.09	(0.02)
right censored wage	-0.48	(0.15)
female	-0.09	(0.02)
urban	-0.01	(0.05)
part-time	-0.00	(0.03)
married	-0.15	(0.03)
v_1	-2.80	(0.19)
v_2	-3.74	(0.15)

	estimate	(s.e.)
p_1	0.40	(0.16)
p_2	0.60	(0.16)
λ_1	-0.13	(0.04)
λ_2	-0.26	(0.05)
λ_3	-0.43	(0.06)
λ_4	-0.80	(0.07)
λ_5	-1.05	(0.10)
λ_6	-1.05	(0.12)
log $\mathcal{L}$	-40,739.8	
N	21.079	

	statistic	(d.f.)
IM mixing dist.	6.95	(2)
Wald sectors	628.99	(16)
Wald months	108.54	(11)
Wald provinces	20.75	(11)

Note: Based on the UI data. Sector, month of inflow and province dummies are included. Cell refers to municipality x month of inflow UI x sector – groups. The sanction rate in each cell is included as a regressor. Also, the number of individuals in each cell is regressed on municipality, month of inflow UI, and sector dummies, which gives predicted cell counts $\hat{c}$ and residuals $\hat{\epsilon}$. Age in 10 years; wage is daily wage in referral period in 100 Dutch guilders. Wages are right censored at 430 guilders. All variables are included in deviation from their sample means. An Information Matrix (IM) test statistic for local parameter variation in (vi, v_2), or, equivalently, (vi, v_2, pi, p_2), and Wald tests for the joint significance of the 3 groups of dummies are included. All tests are asymptotically χ^2 distributed with the degrees of freedom given in parentheses.

Table 16: Simulated re-employment probabilities

	$\Pr(t \leq 26$ weeks)	$\Pr(t \leq 52$ weeks)
sample mean	**0.54**	**0.72**
sanction indicator		
non-displaced	0.49	0.66
displaced	0.55	0.73
age (years)		
20	0.70	0.86
30	0.58	0.76
40	0.44	0.61
50	0.32	0.46
daily wage (guilders)		
50	0.50	0.68
100	0.53	0.71
150	0.56	0.74
200	0.59	0.77
gender		
female	0.52	0.70
male	0.56	0.74
urbanization		
urban	0.54	0.72
not urban	0.54	0.72
hours		
part-time	0.54	0.72
full-time	0.54	0.72
marital status		
married	0.51	0.69
not married	0.56	0.74

Note: Probabilities are computed using the model estimates of Table 15. The first row is computed at the mean of the regressors in the sample used for estimation, and the estimated mean of the unobserved heterogeneity component. All other rows correspond to single deviations from this mean.

Table 7: Changes in earnings after displacement

	all workers				tenure $\geq$ 1 yr.	
	estimate	(s.e.)	estimate	(s.e.)	estimate	(s.e.)
constant	0.160	(0.036)	0.197	(0.038)	0.199	(0.046)
log tenure	0.016	(0.009)	-0.011	(0.015)	-0.025	(0.018)
(log tenure)^2	-0.004	(0.005)	0.001	(0.005)	0.009	(0.016)
log age	-0.101	(0.053)	-0.087	(0.053)	0.002	(0.062)
(log age)^2	0.272	(0.153)	0.281	(0.153)	0.190	(0.185)
spell	-0.008	(0.003)	-0.008	(0.003)	-0.008	(0.004)
d^I_{displ}	-0.003	(0.033)				
d^{II}_{displ}			-0.049	(0.040)	-0.050	(0.038)
female	-0.025	(0.024)	-0.024	(0.024)	-0.024	(0.030)
education						
intermediate	-0.002	(0.027)	-0.004	(0.027)	0.013	(0.032)
higher	-0.022	(0.035)	-0.022	(0.035)	-0.043	(0.041)
university	-0.030	(0.056)	-0.029	(0.055)	-0.083	(0.068)
married/cohabitating	-0.049	(0.029)	-0.051	(0.029)	-0.067	(0.035)
non-Dutch	0.078	(0.074)	0.069	(0.074)	-0.012	(0.086)
tenure < 1 year			-0.104	(0.040)		
R^2	0.024		0.031		0.029	
N	1069		1069		668	
# displaced	168		116		116	

Note: Based on the LFS. Data on all transitions between jobs with or without intervening non-employment spells (E-E, ***E-U-E*** and ***E-N-E)*** are included. Dependent variable is the change in log real after-tax monthly earnings between the pre- and post-separation employment spell. 'Tenure' is tenure on the pre-separation job in months, and is also used to select the cases in the right panel. 'Age' denotes the age at the date of the first interview in years. 'Spell' is the duration of the non-employment spell between the pre- and post-separation jobs in months (0 for ***E-E cases).*** d^I_{displ} is a dummy indicating whether the separation was caused by displacement, using the definition discussed in the main text. d^{II}_{displ} equals d^I_{displ} with the additional requirement that the tenure of the displaced individual equals at least 1 year. Reference states are 'non-displaced', 'male', 'primary/lower education', 'unmarried and not cohabitating', 'Dutch', and 'tenure $\geq$ 1 year'. 'log tenure', 'log age', and 'spell' are included in deviation from their sample means. In '(log tenure)^2' and '(log age)^2' both 'log tenure' and 'log age' are in deviation from their sample means, which correspond to geometric means of tenure and age equal to respectively 18.0 months and 28.9 years in the full sample and 39.8 months and 29.9 years in the tenure-restricted sample.